Remarks

The Examiner is respectfully requested to reexamine and allow the application in view of the following points.

Interview

The undersigned, Mr. Herro, and the other applicants thank the Examiner for his courtesy and helpful remarks during the Office interview on April 13, 2005, respecting this application. The applicants discussed the Gillespie and Knox references of record, presented substantially the following arguments for patentability, and showed the Examiner during the interview the light color of cremated remains, indicating a lack of carbon, versus the well-known intense black color of carbon obtained from cremated remains according to the present invention. While no agreement was reached on allowable claims, the Examiner agreed to reconsider his position in view of a written submission of the points raised.

35 USC 112 – Written Description

The rejection for lack of written description was based on the second preliminary amendment changing "remains" to "tissue" in many claims. While the applicant has presented a basis for the amendments, in the interest of simplifying issues in this application the amendments have been withdrawn. Claims 14-17 as amended again recite "remains." The applicant reserves the right to re-assert the amendments in future prosecution.

35 USC 103
Introduction – Getting Carbon from Cremated Remains is Surprising: Cremation Intentionally Destroys Carbon

None of the prior art of record provides an enabling disclosure of the present claimed process for extracting enough carbon from already-cremated remains to make a diamond. This process is counter-intuitive to those skilled in the art, who know that the cremation process is deliberately carried out in a manner (abundant oxygen, high temperature, long process) that is understood in the art to remove all the burnable material that can be extracted, particularly carbon. U.S. Pat. Nos. 4,603,644 and 5,957,065 relating to cremation state:

> Once combustion is under way, little fuel need be supplied through either of the burners 57 or 74, but it is important to make sure of an abundance of air in the afterburner chamber all the time to make sure that all that can be burnt is burnt. Thus, the changes in velocity lead to the formation of a fireball in the corner portion 76, and the thorough mixing at that point ensures that all combustible particles are thoroughly burned.

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U.S. Pat. No. 4,603,644, Col. 4, lines 44-51.

> When the gases and particles reach the afterburner chamber, they are mixed with an excess of air; because the easily combustible particles are still present an environment is created where even the hardest-to-burn particles may be oxidised.

U.S. Pat. No. 4,603,644, col. 1, lines 18-24.

> The whole process of cremation of a typical coffin and its contents takes several hours, from placing the coffin in the chamber 50 until the calcified ashes are sufficiently broken down that they can be reduced to a fine powder.

U.S. Pat. No. 4,603,644, Col. 3, lines 8-12.

> In the unit shown in the drawings, the second stage of cremation takes place in the ash trough 67. The ash trough 67 is located, in the cremator of the invention, at the very hottest place, in that it is in the coffin chamber, and is surrounded not by outside walls but by the afterburner chamber 70, and by the coffin chamber 50. Only over the small area at its very edges is the ash trough 67 close to the relatively cooler outer walls, i.e., the side walls 36, 37, of the cremator 30.

U.S. Pat. No. 4,603,644, Col. 3, lines 20-28.

> In the invention, the access port by which the fully consumed ash may be removed from the incinerator is in the side of the incinerator....

U.S. Pat. No. 4,603,644, Col. 1, lines 39-42.

> The secondary combustion tube 20 is provided with second burner 60 and associated air inlet jet 62, which second burner arrangement ensures as far as possible 100% combustion within the secondary combustion tube 20 of gases, particulates and other remnant combustible matter carried in the waste gases exhausted from the primary combustion chamber 10. In FIG. 2 the general direction of circulation of gases within the cremator is indicated by arrows.

U.S. Pat. No. 5,957,065, Col. 4, lines 42-51.

> Over recent years in many countries of the world legislation has been introduced which places even more stringent requirements on the content of waste gases emitted from cremator installations, particularly with respect to ensuring complete combustion of gases and fine particulates entrained therein exiting from the combustion chamber(s) before being released from the cremator via an exhaust flue. Laws now generally required that the waste gases exhausted from the combustion chamber(s) are retained in a retention zone heated to a temperature of at least 850 degree C. (as is the case in Europe) for a period of at least two seconds, before being allowed to pass to the exhaust flue and released into the atmosphere. This period of retention of the waste gases in the heated retention zone ensures complete combustion of gases and any remnant or fine particles

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> entrained therein which may not have been fully burned during the main combustion process.

U.S. Pat. No. 5,957,065, Col. 1, lines 36-52.

> There are various known designs of cremators of the type having a primary combustion chamber for receiving through a charge door thereof a coffin or other object for cremating by means of a burner directed into the primary combustion chamber, and a secondary combustion chamber, separate from the primary combustion chamber, through which are passed the gases, particulates and other exhaust materials from the primary combustion chamber to ensure maximum burning of combustible material during the cremation process.

U.S. Pat. No. 5,957,065, Col. 1, lines 16-25.

> Such dual combustion chamber furnaces are advantageous over known single combustion chamber furnaces, because of the higher degree of burn-off of combustible material from the coffin or other object being cremated. In fact, nowadays such dual combustion chamber cremators are generally essential in order to satisfy legal, environmental and aesthetic requirements as regards waste emissions from cremator installations.

U.S. Pat. No. 5,957,065, Col. 1, lines 17-35.

> The temperature at which the primary and secondary combustion chambers 10 are operated will typically be of the order of up to 1300 degree C. as is generally the case with known cremator designs. As hot waste gases from primary combustion chamber 10 pass up and out thereof and into secondary combustion tube 20 via mixing chamber 11, intimate mixing of the exiting gases and incoming air from the second burner arrangement 60, 62 occurs, which promotes optimum secondary combustion within the secondary combustion chamber 20.

U.S. Pat. No. 5,957,065, Col. 4, lines 43-49.

Over and over, the above prior art emphasizes completely burning the combustible material from the human or animal remains during the cremation process, and indicates that this goal is achieved. One of ordinary skill in the art therefore would not expect any carbon to be scavenged from cremated human or animal remains.

The products of **cremation** – thorough **burning** for a long time with **abundant oxygen**, as required by the present invention – are readily distinguished from the products of **pyrolysis** – a technique of recovering carbon from organic remains, such as bone, by heating remains in the **absence of oxygen** to evaporate volatiles **without burning**. See e.g. the Knox reference, which describes at col. 4, lines 26-31, pyrolysis of bone in "oxygen-free nitrogen" to obtain a

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"completely black composite material" – essentially free carbon. The present invention is expressly limited to getting carbon from cremated remains, which cannot be done by pyrolysis because the accessible carbon is already gone, as shown by the light color of cremated remains, versus the "completely black" product of pyrolysis.

Gillespie is Non-Enabling

The Gillespie article, viewed by one skilled in the art, does not discuss or solve the fundamental problem with making a diamond from cremated remains – cremation is a process dedicated to eliminating carbon from the remains, and carbon is what is needed to make a diamond. In short, Gillespie is non-enabling – not surprising for a short newspaper feature. Even if broadly read to suggest that one can make diamonds from conventional cremated remains, as opposed to requiring a modified cremation process or uncremated remains, Gillespie does not even suggest the problem faced by one trying to extract carbon from cremated remains, and certainly provides no solution to that problem. A prior art reference that suggests an idea thought to be impossible, but fails to enable one skilled in the art to practice the idea, cannot anticipate or make obvious the claim of even a later inventor who enables the invention.

The Grizenko Declaration cited during the prosecution of the parent application (10/100,666, one of two declarations filed July 15, 2003) indicates that Mr. Grizenko has intimate familiarity with synthetic diamond production (Par. 1). Mr. Grizenko confirms, in Paragraph 13, "The Gillespie article makes several references to the use of 'ashes' to make 'diamonds.' However, the use of the term 'ashes' in the fields of carbon purification and diamond production indicates that no useable form of carbon is present after cremation. Without carbon or a process to extract carbon from the ashes, a diamond cannot be produced."

The Gillespie article states, "They have applied for a patent on the process." Even if the patent application provided an enabling disclosure, evidently no patent was granted. The applicants have searched the PTO full text database for such a patent or patent application, based on information stated in the Gillespie article about the inventors, with the query and results below:

"Results of Search in db for:

(diamond AND IN/((vaughn AND Steven) OR (clyde AND Higa))): 0 patents.

No patents have matched your query."

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"Results of Search in PGPUB Production Database for:
(diamond AND IN/((vaughn AND Steven) OR (clyde AND Higa))): 1 applications.
Hits 1 through 1 out of 1
1 20040221259 Method and apparatus for status display with intermediate database access

Since the Gillespie article was published in 1988, it is extremely unlikely that the application referred to in the article remains pending, yet unpublished, to this day.

If the inventors mentioned in Gillespie et al. actually discovered how to extract carbon from cremated remains, but kept the key details secret and abandoned the attempt to patent it, they are not entitled to a patent, and their work does not stop a later, independent inventor who disclosed the invention from getting a patent. The whole point of the patent system is to encourage disclosure of the invention, instead of keeping it secret.

Lacking an enabling disclosure, and in addition lacking any disclosure of the particular carbon recovery method recited in present claim 15, the Gillespie newspaper article has no value as prior art against the present invention. One skilled in the art, not seeing in Gillespie any way to recover carbon from conventional cremated remains, and not otherwise aware of a way to do so, would discard Gillespie's idea as impossible.

Hunter Does Not Disclose Diamond Formation

The Hunter reference relates to the production of silicon carbide from conventional chemical sources (not human or animal remains), and does not disclose the formation of diamond or the extraction of carbon from cremated remains.

Claims 14-17 each recite, or incorporate by reference to earlier claims, at least three steps that are not disclosed in the Hunter reference:

a. *providing cremated human or animal remains;*

b. *collecting residual carbon from said cremated human or animal remains; and*

c. *converting said residual carbon to diamond.*

Thus, the Hunter reference is not pertinent to the claimed invention.

Therefore, the present invention of claims 14-17, in which carbon is derived from human or animal remains after cremation, produces a surprising result that would not be expected by those of ordinary skill in the art. The rejection based on Hunter and Gillespie, therefore should not be repeated.

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Claim 15 Process Is Not In The Cited Prior Art

Moreover, claim 15 is further distinguished from the cited prior art by its requirement that the carbon "collecting step is carried out by adding additional carbon to said cremated human or animal remains and purifying said cremated human or animal remains in the presence of said additional carbon." No such process is disclosed in the Gillespie or Hunter prior art. Dr. Froberg's Second Declaration of March 3, 2004, provides evidence that adding sacrificial carbon to the ash increases the amount of carbon retrieved from the original remains. See, for example, Paragraphs 9, 10, 11, and 14.

Conclusion

For the stated reasons, claims 14-17 are patentable and should be allowed immediately.

Please charge any additional fees or credit overpayment to the deposit account of McAndrews, Held & Malloy, Ltd., Account No. 13-0017.

Respectfully submitted,

May 2, 2005

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